



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/NL00/00213</p> <p>(22) International Filing Date: 30 March 2000 (30.03.00)</p> <p>(30) Priority Data: 1011794 14 April 1999 (14.04.99) NL</p> <p>(71) Applicant (for all designated States except US): VISSER'S-GRAVENDEEL HOLDING B.V. [NL/NL]; Beneden Havendijk 115a, NL-3295 XB 's-Gravendeel (NL).</p> <p>(72) Inventor; and (75) Inventor/Applicant (for US only): VISSER, Cornelis, Frans, Taco [NL/NL]; Molenvliet 7, NL-3295 LJ 's-Gravendeel (NL).</p> <p>(74) Agent: EVELEENS MAARSE, Pieter, Arnold &amp; Siedsma, Sweelinckplein 1, NL-2517 GK The Hague (NL).</p>	<p>(81) Designated States: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>With international search report.</i> <i>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> <i>In English translation (filed in Dutch).</i></p>	
(54) Title: COMPOSITION OF RIGID GROWING SUBSTRATE AND METHOD OF PRODUCING SAME		
<p>(57) Abstract</p> <p>The invention relates to a substrate composition, comprising substrate material and material providing structure and form arranged distributed in the substrate material, wherein the particles forming part of the structure-providing material are mutually connected at least partially by a binder. As a result of this binder it is no longer necessary to perform a temperature treatment, so that the associated drawbacks are avoided. In addition, the form-retention of such a unit is considerably greater than the prior art units. The substrate material is preferably formed by potting compost or another organic material. The binder is preferably formed by a pre-polymer reacting with water. This has the advantage that the polymerization takes place when water comes into contact with the binder. This takes place for instance when the binder is brought into contact with the potting compost.</p> <div data-bbox="1068 1129 1409 1927"> </div>		

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**COMPOSITION OF RIGID GROWING SUBSTRATE AND METHOD OF  
PRODUCING SAME**

5

The invention relates to a substrate composition comprising substrate material and material providing structure and shape arranged distributed in the substrate material.

10       Such a substrate composition is known from EP-A-0 249 261.

      In this prior art substrate composition use is made of substrate material formed by fibres and the material providing structure and shape is formed by thermoplastic  
15 fibres.

      This has the result that in order to form form-retaining units the substrate material must be subjected to a temperature treatment. This requires much energy. The form-retention of such a unit is moreover generally  
20 very mediocre; such a unit will already disintegrate when only a small force is applied. This makes mechanical handling of such units difficult.

      The object of the present invention is to provide a substrate composition, wherein the above stated drawbacks  
25 are obviated.

      This objective is achieved in that the particles are mutually connected by a binder.

      As a result of this binder it is no longer necessary to perform a temperature treatment, so that the  
30 associated drawbacks are avoided. In addition, the form-retention of such a unit is considerably greater than of the prior art units.

      The substrate material is preferably formed by potting compost or other organic material.

35       Particularly in recent years much resistance has arisen to the use of pure synthetic substrate substances, because it is assumed that these have an adverse effect on the flavour of the products cultivated on substrate

manufactured from such material. There is therefore an increasing need for the use of substrate of organic origin.

Further known is the use of foam particles as material providing structure and shape in such prior art substrates. The foam particles have the function here of improving the water-absorbing properties of the substrate. The presence of such foam particles thus also makes it possible to apply the binder according to the present invention. The advantage of the present invention is herein combined with the advantage of applying foam particles.

It is pointed out here that the present invention is certainly not limited to the application of foam particles; the use of fibres is envisaged in the first instance.

A combination of both forms is of course also possible.

According to a preferred embodiment the fibres or foam particles are formed from a polymer.

The binder is preferably formed by a pre-polymer reacting with water.

This has the advantage that the polymerization takes place when water comes into contact with the binder. This takes place for instance when the binder is brought into contact with the potting compost.

The degree of integrity and strength of the units formed from the substrate composition can be determined by varying the quantity of fibres and the amount of binder.

Other attractive embodiments are stated in the remaining claims.

The present invention will be elucidated hereinbelow with reference to the annexed drawings, in which:

figure 1 shows a perspective view of a plant block which is manufactured with the substrate composition according to the present invention; and

figure 2 shows a partly broken-away perspective view of a device for manufacturing such a block.

As shown in figure 1, the preferably applied mixture according to the present invention is formed by potting  
5 compost, around which a certain content of fibres is arranged. Block 1 is herein provided with a plant 2. On the walls of block 1 the substrate is made up of potting compost 3 and fibres 4. Although potting compost is envisaged in the first instance, it is possible to make  
10 use of other substrates such as synthetic granulate, mineral wool and so on.

It is however of importance for the invention that fibres are arranged for strengthening purposes which are mutually adhered by means of a glue connection so that  
15 the whole composition acquires a certain structure. This provides the option of mechanically processing such blocks 1 without them crumbling. In view of the increased automation in horticulture, this is of the greatest importance.

20 The starting point for preparation of such a substrate composition is a mixing device 5 as shown in figure 2. Mounted in this mixing machine are two shafts 6, on each of which is arranged a number of blades and wherein both shafts 6 are driven by an electric motor 8  
25 via a transmission.

A conveyor belt 9 further leads to the upper side of the mixing device and a conveyor belt 10 leads from the underside to a booster conveyor 11 which throws the thus created mixture into a funnel 12 and then into a filling  
30 device 13, which forms the subject of the Netherlands patent application 9300669, so that no further discussion thereof is required. This filling device otherwise forms no part of the present invention.

A dosing device 13 is further arranged for dosing  
35 the binder. This dosing device is formed by a disc 14 drivable in rotation which is disposed in a horizontal plane and which is drivable in rotation by means of an electric motor 15 and a drive 16. The whole dosing device

is herein placed above the mixing device. A vessel 17 is further arranged which debouches into a conduit 18 in which a constriction (not shown) is arranged so that liquid present in vessel 17 falls dropwise onto disc 14.

5 On disc 14 the liquid is atomized to small droplets and then enters the mixing device.

Here the fibres and the potting compost are once again mixed together thoroughly, while it is also possible that only potting compost is fed via conveyor belt 9. Use  
10 is then made of another device, not shown in the drawing, for supplying the fibres. The binder dosing device 13 is further switched on, whereby small droplets of binder are distributed over the potting compost from disc 14. By combining the process of dispensing the binder with the  
15 process of mixing the potting compost, a good distribution of the binder through the potting compost is obtained. The thus mixed potting compost is fed to filling device 19 via conveyor belt 10, booster conveyor 11 and funnel 12.

20 It is also possible to apply other distributing devices, such as a spray nozzle.

In filling device 19 the material is arranged in cavities arranged in trays, whereafter the binder will cure through the reaction of the binder with water  
25 present in the potting compost. An easily handled unit is hereby obtained.

It is pointed out here that it is particularly attractive to make use of a pre-polymer which reacts with water. Such substances do not influence the growth  
30 process and are otherwise neutral, so that they can be applied without any disadvantage.

## CLAIMS

1. Substrate composition, comprising substrate  
5 material and material providing structure and shape  
arranged distributed in the substrate material,  
**characterized in that** the particles forming part of the  
structure-providing material are mutually connected at  
least partially by a binder.
- 10 2. Substrate composition as claimed in claim 1,  
**characterized in that** the substrate material is formed by  
potting compost or another organic material.
3. Substrate composition as claimed in claim 1 or 2,  
**characterized in that** the particles are formed at least  
15 partially by fibres.
4. Substrate composition as claimed in claim 1, 2 or  
3, **characterized in that** the particles are formed at  
least partially by foam particles.
5. Substrate composition as claimed in any of the  
20 foregoing claims, **characterized in that** the fibres or the  
foam particles are formed from a polymer.
6. Substrate composition as claimed in any of the  
foregoing claims, **characterized in that** the particles  
form about 0.05-5% of the weight of the substrate  
25 material.
7. Substrate composition as claimed in claim 6,  
**characterized in that** the particles form about 0.1-2% of  
the weight of the substrate material.
8. Substrate composition as claimed in claim 7,  
30 **characterized in that** the particles form about 0.2-1% of  
the weight of the substrate material.
9. Substrate composition as claimed in claim 3,  
**characterized in that** the fibres have a cross-section of  
1-100 dTEX.
- 35 10. Substrate composition as claimed in any of the  
claims 3-9, **characterized in that** the fibres have a  
cross-section of 2-50 dTEX.

11. Substrate composition as claimed in any of the claims 3-10, **characterized in that** the fibres have a cross-section of 5-20 dTEX.

12. Substrate composition as claimed in any of the 5 claims 3-11, **characterized in that** the fibres have a length in the range between 3 mm and 50 mm.

13. Substrate composition as claimed in claim 12, **characterized in that** the fibres have a length in the range between 5 mm and 30 mm.

10 14. Substrate composition as claimed in claim 13, **characterized in that** the fibres have a length between 8 mm and 20 mm.

15 15. Substrate composition as claimed in any of the claims 2-14, **characterized in that** the particles are connected with a pre-polymer reacting with water.

16. Substrate composition as claimed in claim 15, **characterized in that** the pre-polymer is a PU pre-polymer.

20 17. Substrate composition as claimed in claim 15, **characterized in that** the pre-polymer is a mono DI or a bi DI.

18. Substrate unit manufactured from substrate material as claimed in any of the foregoing claims, **characterized in that** the culture unit is per se form- 25 retaining.

19. Method for preparing a substrate composition as claimed in any of the claims 1-17, wherein the structure-defining particles are mixed with the substrate, **characterized in that** the binder is added to the mixture 30 in distributed manner.

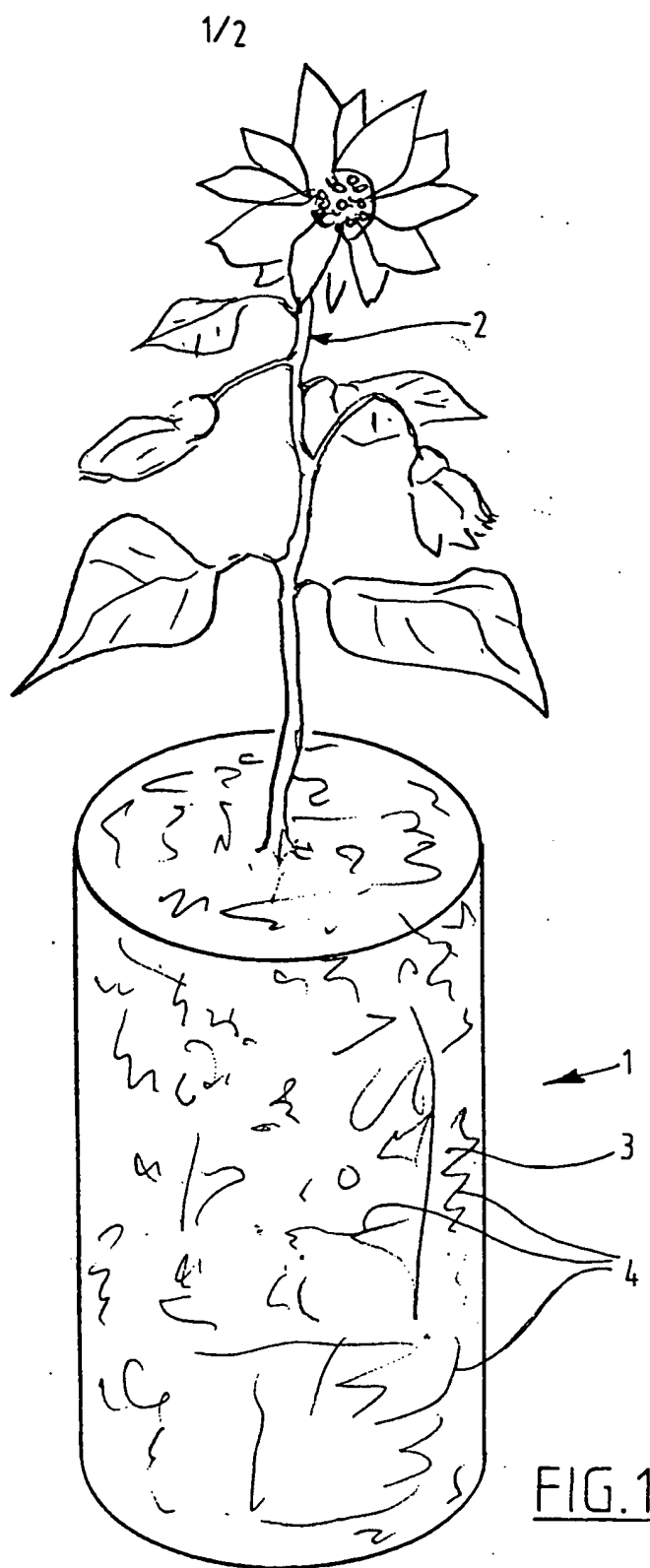
20. Method as claimed in claim 19 for preparing a substrate unit as claimed in claim 18, **characterized in that** after addition of the binder the mixture is placed in moulds for curing of the binder.

35 21. Device for performing the method as claimed in claim 19 or 20, **characterized by** a mixing device for mixing the culture substrate with the structure-providing

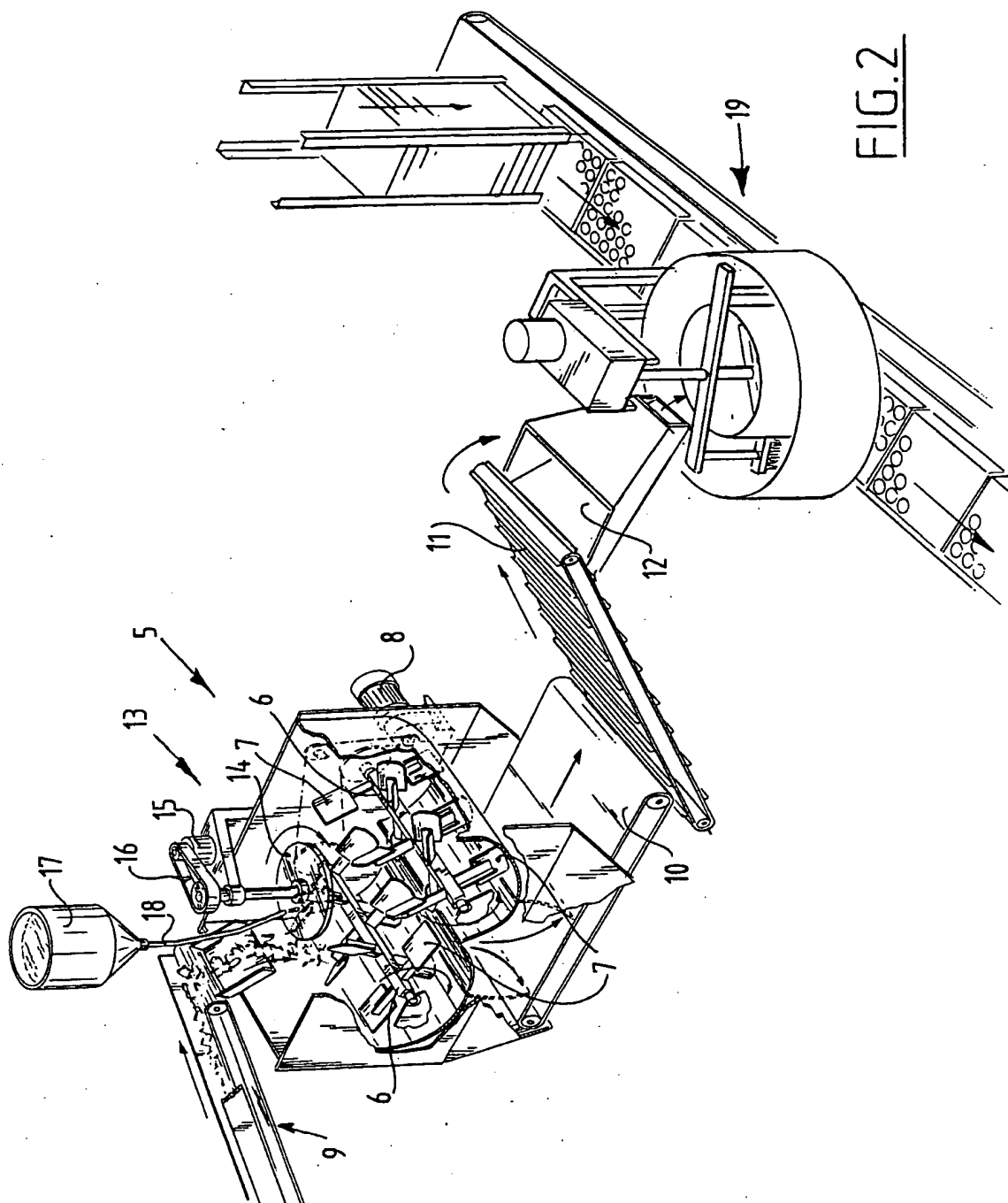


particles and a distributing device for distributing the binder into the mixture.

22. Device as claimed in claim 21, characterized in that the distributing device comprises a disc which is  
5 placed above the mixing device and drivable in rotation and above which is placed a dripper device for supplying binder to the disc in droplet form.



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# INTERNATIONAL SEARCH REPORT

Int'l Application No  
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## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 A01G9/10

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 899 850 A (GLUCK MATERNUS ET AL) 19 August 1975 (1975-08-19) column 2, line 22 -column 3, line 43	1,2,4, 18-21
X	WO 97 16961 A (ROCKWOOL/GRODAN) 15 May 1997 (1997-05-15) page 2, line 15 -page 4, line 26	1-3
X	WO 93 00797 A (GRODANIA AS) 21 January 1993 (1993-01-21) page 4, line 10 -page 6, line 10	1,3
X	GB 2 244 059 A (FOSSE LTD) 20 November 1991 (1991-11-20) page 4, line 32 -page 6, line 25	1,3
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 3 834 072 A (RACK D) 10 September 1974 (1974-09-10) column 1, line 47 -column 2, line 27	1,2,4
X	EP 0 350 132 A (ROCKWOOL LAPINUS BV) 10 January 1990 (1990-01-10) page 1, line 23 -page 2, line 16	1,3
X	FR 2 445 103 A (SALIGNY CLAUDE) 25 July 1980 (1980-07-25) page 2, line 13 -page 3, line 15	1-3
A	EP 0 249 261 A (FIBRACONSULT MANAGEMENT UND BE) 16 December 1987 (1987-12-16) cited in the application the whole document	1

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Int'l. Application No

PCT/NL 00/00213

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 3899850 A	19-08-1975	NONE	
WO 9716961 A	15-05-1997	AU 7624696 A CA 2237101 A EP 0865236 A JP 2000501283 T PL 326493 A	29-05-1997 15-05-1997 23-09-1998 08-02-2000 28-09-1998
WO 9300797 A	21-01-1993	AU 2311592 A	11-02-1993
GB 2244059 A	20-11-1991	NONE	
US 3834072 A	10-09-1974	AT 208570 A CA 959282 A DE 2025316 A FR 2049836 A GB 1296746 A JP 49021379 B NL 7008186 A AT 1085469 A AT 1085569 A	15-02-1975 17-12-1974 10-12-1970 26-03-1971 15-11-1972 31-05-1974 08-12-1970 15-02-1975 15-02-1975
EP 0350132 A	10-01-1990	NL 8801724 A AT 89117 T CA 1322848 A DE 68906471 D DE 68906471 T DK 337989 A EP 0498971 A ES 2040451 T FI 893277 A,B, JP 2079918 A NO 892784 A,B, US 5218783 A	01-02-1990 15-05-1993 12-10-1993 17-06-1993 14-10-1993 08-01-1990 19-08-1992 16-10-1993 08-01-1990 20-03-1990 08-01-1990 15-06-1993
FR 2445103 A	25-07-1980	BE 880966 A DE 7936342 U	16-04-1980 22-05-1980
EP 0249261 A	16-12-1987	NL 8601217 A DE 3765848 D FI 872120 A,B,	01-12-1987 06-12-1990 15-11-1987